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MINDFULNESS-BASED STRESS REDUCTION: AN INNOVATIVE WORKSHOP TO REDUCE STRESS AND IMPROVE THE PERFORMANCE OF CONSTRUCTION PROFESSIONALS

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Abstract: The construction industry is known to be a stressful, and construction professionals (CPs) face a great deal of stress at work that may harm their performance. In recent years, the popularity of mindfulness for managing stress has grown. Mindfulness-based stress reduction (MBSR) workshops are considered an innovative approach to managing stress and improving performance. However, this new approach has not yet been explored in the construction industry. This study aims to investigate the impact of MBSR workshops on CPs, by comparing the mean differences in pre- and post-workshop between MBSR and control groups. A questionnaire survey was administered before and after the MBSR workshop. Semi-structured interviews were also conducted individually after the completion of the workshop. An independent t-test, Pearson correlation and contextual analysis were used to examine differences in mindfulness characteristics, emotional stress, and organizational performance. The findings revealed that most of the mindfulness characteristic items received significantly higher scores among the MBSR participants as compare to non-participants. The results of all analysis (i.e., independent t-test, Pearson correlation, and contextual analysis) show that mindfulness characteristics have a direct influence on CPs, improving their organizational performance by reducing their emotional stress. Therefore, this study reveals that MBSR workshops have a practical impact, both reducing stress and improving performance. It is thus recommended to introduce this new approach in organizations, particularly in the construction industry. Finally, we also propose new directions for further research, including longitudinal studies to identify the long-term effects of MBSR training in the construction industry.

1 INTRODUCTION

The construction industry has been recognized as a high-risk occupation for work-related stress (Leung et al. 2016). Most construction projects are characterized as demanding, complex, dynamic, uncertain, and crisis-ridden in nature, increasing the stress of construction professionals (CPs) (Leung et al. 2007, Chan et al. 2014). Stress is the foremost cause of illness-related absenteeism from work and costs over £5 billion a year in the UK (HSE 2018). In a survey study conducted by the Chartered Institute of Building CIOB, around 70% of CPs reported experiencing stress in their work (Chan et al. 2018). Stress has damaging consequences on health both physical and mental, reduces performance, weakens relationships, and leads to higher turnover and more accidents (Gatti et al. 2014, Leung et al. 2012). Many studies have reported that if stress is not properly managed, both the performance and health of employees are affected (Cattell et al. 2016). Today, both clinical psychologists and medical doctors are using mindfulness practices to help patients cope with a variety of diseases (Baer 2003). Several studies have found that mindfulness has a wide range of positive results in various types of workplace, such as

improving social relationships, resiliency, task performance, task commitment, enjoyment, and memory (Levy et al. 2012). Many organizations, such as Aetna and Google, have thus started to provide mindfulness training to their employees to improve their well-being and efficiency (Hyland 2015). However, little research has been conducted on the impact of mindfulness characteristics on emotional stress and organizational performance among CPs.

1.1 Mindfulness-Based Stress Reduction

MBSR programs are designed to cultivate the trait of mindfulness (Kabat-Zinn 1990). Mindfulness could be considered a comprehensive concept with numerous widely known features, including *awareness*, *attention*, *description*, *curiosity*, *acceptance*, and *non-reactivity* (Shapiro et al. 2007, Kabat-Zinn et al. 1985). Leung et al. (2016) categorized mindfulness characteristics into three broad groups: *attention*, *enlightenment*, and *attitude*. MBSR programs have become the most successful interventions for reducing participants' pain, stress, depression, and other mental health problems (Li et al. 2016). Traditionally, MBSR workshops take the form of an eight-week training program (2.5 hours/week) in which participants can learn various mindfulness skills through both formal and informal practices (Kabat-Zinn 1994). Although there are no specifically agreed definitions of formal and informal practice, formal practice usually involves special time set for mindfulness practice, like a body scan, sitting meditation, mindful yoga, and so on; informal mindfulness practice represents mindful moments involving awareness of daily activities, such as mindful eating, walking, bathing, and so on (Birtwell et al. 2018, Kabat-Zinn et al., 1992). Mindfulness programs offer mental exercise through various meditative approaches which train the individual to calm their mind consciously, and eventually to attain inner peace (Ospina et al. 2007). Furthermore, they propose easy, low-cost, and relaxing methods that elude the stigma attached to psychiatric treatment (Chen et al. 2012).

1.2 Emotional Stress

Emotional stress is a negative consequence triggered by working in a stressful environment (Lazarus and Folkman 1984). It occurs when individuals become emotionally drained, chronically exhausted, and have lost the ability to deal with demanding and stressful job situations (Leung 2007, Leung et al. 2014). Fatigue and frustration arise when the individual fails to obtain expected rewards in their work, life, and relationships (Freudenberger 1983). Employees suffering from emotional stress may not perform their work correctly, because this stress may affect their attention, motivation, and commitment, which hinders their ability to harness positive energy (Drago et al. 1986). Ultimately, all these symptoms can lead to impaired health and work performance among CPs and, thus, indirectly, harms the success of projects (Leung 2008). Emotional stress also induces harmful consequences for the organization, in the form of absenteeism, loss of productivity, and so on (Finney et al. 2013).

1.3 Organizational Performance

The organizational performance of CPs plays a vital role in the success of construction projects. It is important to understand the impact of stress on the organizational performance of CPs because the high rate of turnover among these professionals affects the success of projects (Alzahrani and Emsley 2013). It is well documented that job stress and emotional stress have negative and harmful associations with the organizational performance of CPs (Nandram and Bert 1993). For example, depression and anxiety can diminish the emotional attachment of CPs to their organization (Cockshaw and Shochet 2010). Another study confirms that burnout is the primary cause of poor organizational performance (Mostert et al., 2011). This means that stress has a significant influence on the performance of CPs. Many studies have revealed the effectiveness of mindfulness in reducing stress and improving performance (Leung et al. 2016). The present study aims to investigate the effect of mindfulness characteristics in achieving these results through an MBSR workshop for CPs.

2 CONCEPTUAL MODEL

Based on the literature review, a conceptual model for the Mindfulness Characteristics–Emotional Stress–Organizational Performance has been developed for CPs (see Figure 1). It demonstrates that mindfulness characteristics are related to the organizational performance and also it can reduce the emotional stress of CPs.

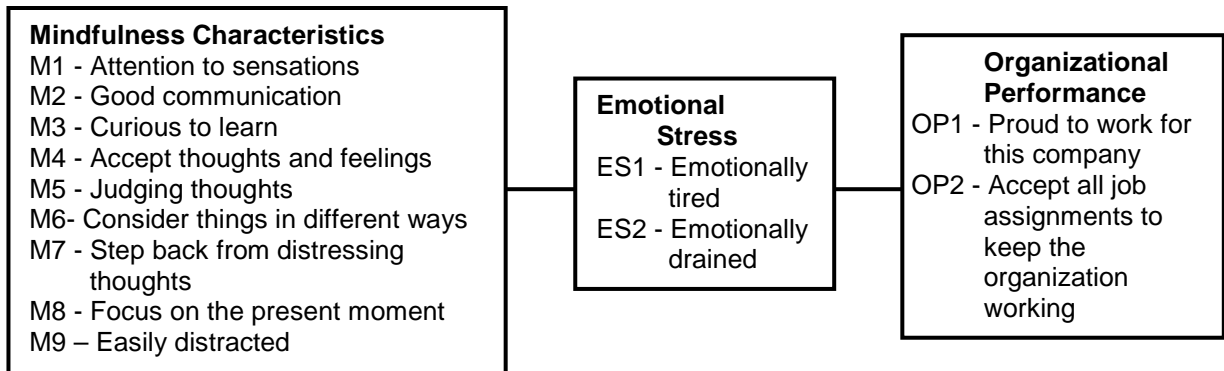


Figure 1: Conceptual Model of Mindfulness Characteristics, Emotional Stress, and Organizational Performance

3 RESEARCH METHODOLOGY

To investigate the impact of MBSR workshops in the stress management of CPs, an intervention study was carried out. One group of CPs received eight weeks of full MBSR training workshops, while for comparison another group of CPs was treated as a control group who received no MBSR training. Rather than sticking to one method, this research adopted both quantitative (questionnaire surveys) and qualitative (interviews) approaches to secure good psychometric properties. A questionnaire survey was administered to the two groups of CPs before and after the eight-week MBSR workshop. The questionnaire contained four sections: 1) demographic information; 2) emotional stress (Maslach et al., 1996); 3) eight mindfulness characteristics (Baer et al. 2004, Kumar et al. 2008, Walach et al. 2006), and 4) organizational performance (Hagerty and Patusky 1995). All the questions on emotional stress, mindfulness characteristics, and organizational performance were extracted from validated 7-point Likert scale to ensure their reliability. For the qualitative study, semi-structured interviews were conducted with few participants individually after the completion of the MBSR workshop. An independent samples t-test was performed to determine differences in mindfulness characteristics, emotional stress, and organizational performance between the MBSR group and the control group. After t-test, Pearson correlation was conducted to investigate the strength and direction of the relationships among items. Qualitative contextual analysis was used to compare the improvement produced by the MBSR workshop by identifying keywords and critical changes.

4 RESULTS

4.1 Independent t-test

After the MBSR workshop, an independent samples t-test was conducted to analyze the collected data and to determine differences in mindfulness characteristics, emotional stress, and organizational performance between the MBSR group and the control group (see Table 1). In the comparison of nine mindfulness characteristics items, five mindfulness characteristics, *attention to sensations* ($p < 0.000$), *good communication* ($p < 0.019$), *curious to learn* ($p < 0.000$), *step back from distressing thoughts* ($p < 0.002$), and *focus on the present moment* ($p < 0.002$), exhibited significant differences between the two groups. The mean scores of the MBSR group were higher than those of the control group in all nine

mindfulness items. Similarly, two items of emotional stress and one item of organizational performance showed significant differences between groups

Table 1: t-test for Mindfulness Characteristics, Emotional Stress, and Organizational Performance

Items	Pre-MBSR				Post-MBSR				
	Mean (P)	Mean (NP)	Mean Dif.	Sig. (2-tailed)	Mean (P)	Mean (NP)	Mean Dif.	Sig. (2-tailed)	
Mindfulness Characteristics									
Attention to sensations	M1	4.308	3.539	0.769	0.262	5.846	3.231	2.615	0.000
Good communication	M2	3.539	3.769	-0.231	0.707	4.615	3.308	1.308	0.019
Curious to learn	M3	4.154	3.462	0.692	0.168	5.231	3.231	2.000	0.000
Consider things in different ways	M4	5.000	4.692	0.308	0.602	5.077	4.308	0.769	0.050
Accept thoughts and feelings	M5	4.769	4.923	-0.154	0.787	5.231	4.539	0.692	0.231
Judging thoughts	M6	4.231	4.385	-0.154	0.717	4.615	4.308	0.308	0.502
Step back from distressing thoughts	M7	4.692	3.462	0.923	0.068	5.000	3.539	1.462	0.002
Focus on the present moment	M8	4.308	3.923	0.385	0.442	5.462	3.769	1.692	0.002
Easily distracted	M9	4.154	3.539	0.615	0.263	3.846	3.539	0.308	0.563
Emotional Stress									
Emotionally tired	ES1	4.692	4.692	0.000	1.000	3.462	5.154	-1.692	0.010
Emotionally drained	ES2	4.385	4.539	-0.154	0.832	3.231	5.000	-1.769	0.004
Organizational Performance									
Proud to work for this company	OP1	4.462	4.692	-0.231	0.704	4.923	4.769	0.154	0.802
Accept all job assignments to keep the organization working	OP2	5.154	4.385	0.769	0.155	5.308	4.000	1.308	0.044

Notes: **Bold text** represents significant difference at 0.01 and 0.05 level (2-tailed) and 0.06 level; P=participant; NP=non-participant.

The mean score of the MBSR group was significantly lower than those of the control group for emotional stress ES1 (MD=-1.692; $p<0.010$) and ES2 (MD=-1.769; $p<0.004$). Of the two organizational performance items, one showed significant differences. However, overall, the MBSR participant group had significantly higher scores than the control group in both organizational performance items: OP1 (MD=0.154) and OP2 (MD=1.308; $p<0.044$). On the other hand, no significant differences were found between the groups before the MBSR workshop.

4.2 Pearson's Correlation Analysis

To further ensure the reliability of the relationships, Pearson correlation was performed to determine the strength and direction of the relationships among emotional stress, mindfulness characteristics, and organizational performance (see Table 2). The results of Pearson correlations showed that seven of the nine mindfulness characteristics items had a significant negative relationship with both emotional stress items: *attention to sensations* (M1:ES1=-.396; M1:ES2=-0.519), *good communication* (M2:ES1=-0.476; M2:ES2=-0.524), *curious to learn* (M3:ES1=-0.428; M3:ES2=-0.507), *consider things in different ways* (M4:ES1=-0.452; M4:ES2=-0.563), *accept thoughts and feelings* (M5:ES1=-0.488; M5:ES3=-0.387), *step back from distressing thoughts* (M7:ES1=-0.453; M7:ES2=-0.459), and *focus on the present moment* (M8:ES1=-0.346; M8:ES2=-0.481). On the other hand, these seven mindfulness items were positively correlated to *accept all job assignments to keep the organization working* (M1:OP2=0.333; M2:OP2=0.412; M3:OP2=0.398; M4:OP2=0.557; M5:OP2=0.357; M7:OP2=0.383; and M9:OP2=0.341),

and only four mindfulness items were positively related to *Proud to work for this company* (M2:OP1=0.398; M3:OP1=0.316; M4:OP1=0.520; and M8:OP1=0.325).

Table 2 Correlation between Mindfulness, Emotional Stress, Organizational Performance

	Items	ES1	ES2	OP1	OP2
M1	Attention to sensations	-.396**	-.519**	0.198	.333*
M2	Good communication	-.476**	-.524**	.398**	.412**
M3	Curious to learn	-.428**	-.507**	.316*	.398**
M4	Consider things in different ways	-.452**	-.563**	.520**	.557**
M5	Accept thoughts and feelings	-.488**	-.387**	0.231	.357**
M6	Judging thoughts	-0.071	-0.092	0.154	0.116
M7	Step back from distressing thoughts	-.453**	-.459**	0.265	.383**
M8	Focus on the present moment	-.346*	-.481**	.325*	.341*
M9	Easily distracted	.371**	0.226	-0.073	0.025
ES1	Emotionally tired	1.000			
ES2	Emotionally drained	.709**	1.000		
OP1	Proud to work for this company	-0.024	-.545**	1.000	
OP2	Accept all job assignments to keep the organization working	-.368**	-.601**	.706**	1.000

Note ~ ** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

4.3 Contextual Analysis

In order to validate the quantitative results and to secure better psychometric properties, five CPs who had participated in the MBSR workshop (A, B, C, G, and K) were invited for individual interviews. Table 3 shows excerpts from the qualitative scripts of the interviews.

Table 3 Qualitative Data from the Five Interviewees

Partici pants	Before MBSR	After MBSR	Properties
B	Yes, <i>attention wanders</i> when there is some stimulus.	I <i>can feel a sensation</i> in my foot when I do a body scan.	Attention to sensations
G	No, <i>I don't describe things</i> .	I can <i>describe things much better</i> since attending the workshop.	Good Communication
A	As I had some basic knowledge on the matter and <i>I am too subjective</i> .	Now, I will <i>observe things in different ways</i> .	Consider things in different ways
K	I <i>worry about my work performance</i> . Sometimes, I feel depressed.	I am worried about my work performance. <i>I accept my ability and will try my best</i> to finish my work.	Accept thoughts and feelings
K	<i>I need a lot of time to forget my negative emotions</i> .	Now, <i>I need less time to forget my negative emotions</i> .	Step back from distressing thoughts
C	I <i>worry about my work</i> . Sometimes I am depressed about my poor performance.	When I try my best to finish my task, <i>I am not that worried about my performance</i> .	Emotional stress
G	I have <i>also thought of giving up my job</i> when under stress.	The <i>thoughts about changing my job have disappeared</i> .	Organizational performance

Notes~ **Bold text** represents keywords reflecting the items.

5 DISCUSSIONS

The findings reveal that the MBSR workshop was an innovative intervention and produced a significant reduction of emotional stress as well as enhancing the organizational performance of CPs (see Fig. 1). The positive impact of the MBSR workshop on the participants can be seen in the results of both the quantitative and qualitative analysis. Before the MBSR workshop, the two groups of participants showed no difference in mindfulness characteristics, emotional stress, or organizational performance. After the MBSR training, many mindfulness characteristic items, including *attention to sensations*, *good communication*, *curious to learn*, *step back from distressing thoughts*, and *focus on the present moment*, were significantly improved and both emotional stress items (*emotionally tired* and *emotionally drained*) were reduced among the MBSR participants relative to the control group. Similarly, this innovative psychological intervention also played a vital role in the improvement of *organizational performance*. This study also confirms the negative relationship between emotional stress and *organizational performance*.

5.1 Emotional Stress and Mindfulness Characteristics

After the MBSR workshop, the attention of the MBSR participants was significantly improved. Suffering from emotional stress symptoms, such as feeling emotionally drained and used up, is common among CPs. Attention has been found to alleviate the emotional stress of CPs, who become aware of their body sensations, conditions, feelings, and their minds wander less to focus on past mistakes and worries about the future (Jones et al. 2013). Those CPs who are more attentive to the present moment and their surroundings can better concentrate on their work efficiently, and reduce their emotional stress. The positive impacts of MBSR in improving the CPs' attention were validated in the qualitative study by participant (B): "*I can feel a sensation in my foot when I do a body scan.*"

The communicative ability of the MBSR participants improved significantly through mindfulness training. Communication skills are highly important for CPs and the success of their projects (Emmitt and Gorse 2009). A lack of communication within a team during the construction process is a significant source of stress (Hampton et al. 2018). If CPs are unable to express their ideas, approaches, and instructions to others clearly, interpersonal issues may arise regardless of their knowledge and skills. Therefore, CPs with good communication skills can more effectively convey and deliver information, and ultimately minimize the chances of interpersonal conflict and stress (Leung et al. 2016). This study has revealed the benefits of MBSR for the communication skills of its participants. One interview participant expressed the positive effects in the following words: "*I can describe things much better since attending the workshop.*" We believe that through improving communication skills, the emotional stress of the CP participants was significantly reduced and organizational performance was improved.

Mindfulness can be helpful to cultivate curiosity and receptivity to new experiences (Costa and McCrae 1987). This study has found that the curiosity to learn grew significantly among MBSR participants. Curiosity is an attitude of eagerness to learn more about one's experiences and new skills, which enhances learning skills (Bishop et al. 2004). Therefore, it is very useful for helping CPs to remain up-to-date with technology and rapid changes in the work environment. Curiosity could also enhance their interest in their work and their sense of enjoyment in their tasks, which will ultimately diminish the adverse effects of emotional stress and improve organizational performance. This interesting change is identified in both correlation and contextual analyses. It can be seen clearly in the comment of one participant after the workshop: "*Now, I will observe things in different ways.*" Therefore, the MBSR participants learned to think out of the box, and less rigidly. The MBSR workshop is an innovative approach because it develops creative thinking, which is crucial for the survival of a company in this modern and competitive era.

Mindfulness non-reactivity items (*step back from distressing thoughts*) improved considerably in the MBSR group. Non-reactivity is the ability to refrain from impulsive reactions to inner experience (Baer et al. 2004). This characteristic has constructive outcomes at work because it affects an employee's willingness to accept their thoughts and emotions, which results in better mental health and work performance (Bond and Bunce 2003). In addition, this positive attitude enhances the sense of mutual respect and encourages a friendly environment among peers. Outside of work, being less reactive to

distressing thoughts and emotional responses has a beneficial influence on family relationships (Khaddouma et al. 2017). One interviewee explained that “*Now, I need less time to forget my negative emotions*” after the MBSR workshop. Hence, this study has identified that the cultivation of mindfulness characteristics has a very positive and productive impact, not only reducing stress but also improving well-being and performance.

5.2 Emotional Stress and Organizational Performance

To mitigate the emotional stress of CPs, this study proposed an innovative intervention (i.e., the MBSR workshop), which effectively managed participants’ emotional stress. Both the quantitative and qualitative analysis show that the MBSR training had an influencing role in reducing emotional stress and improving the organizational performance of participants. This interesting impact can be seen in a statement made by one participant: “when I try my best to finish my task, I am not that worried about my performance.” In addition, the workshop also enhanced the job satisfaction of many participants by making negative thoughts about work disappear. One participant expressed his view: “the thought of changing my job disappeared.” The positive aspects of mindfulness training on employee health, wellness, and organizational performance are well documented (Hyland et al. 2015). In summary, this study identified that overall mindfulness and organizational performance items, improved and emotional stress items reduced significantly because of the MBSR workshop see (Fig. 2).

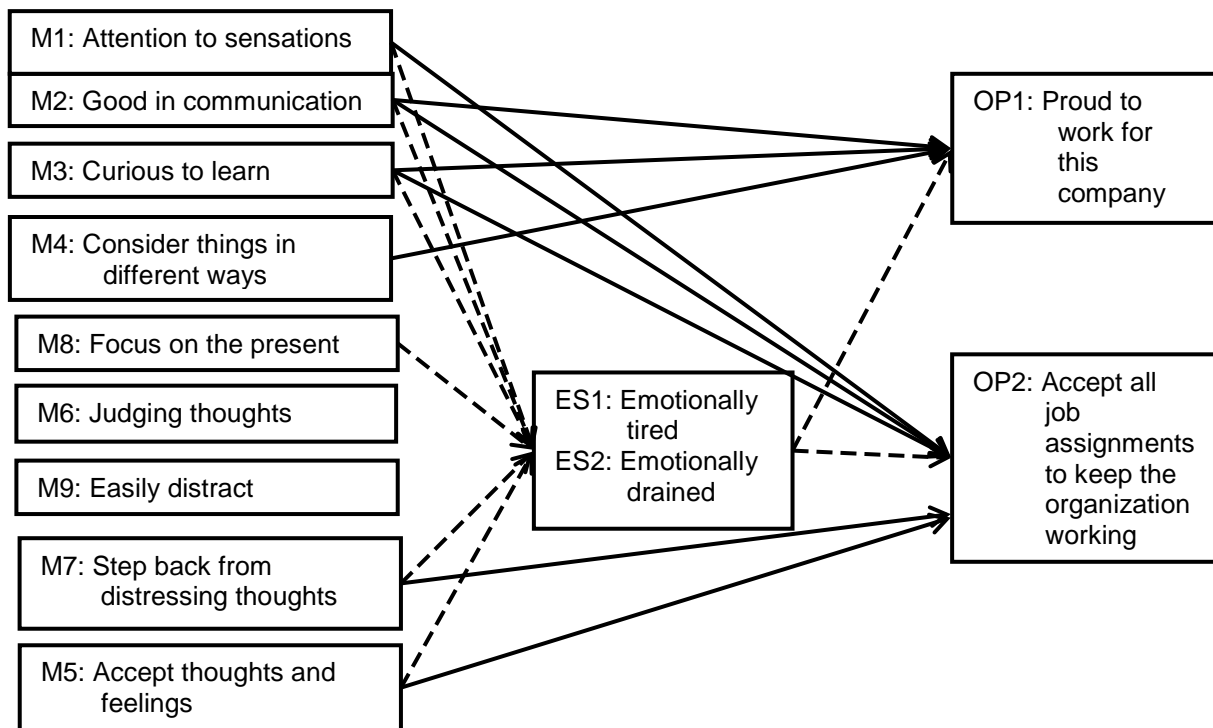


Figure 2: A Mindfulness–Stress–Performance Model for Construction Professionals
 Notes~ - - - -> significantly negative relationship demonstrated by t-test and correlation;
 ———> significantly positive relationship demonstrated by t-test and correlation.

6 RECOMMENDATIONS

On the basis of the useful findings, practical recommendations can be made for both employees and employers in the construction industry. As demonstrated above, MBSR has been revealed to deliver some emotional and performance-related benefits. The current study reveals the negative consequence of emotional stress on organizational performance. It is crucial for construction businesses to counter this

emotional stress through new psychological and social approaches. In order to improve the productivity and the performance of CPs, construction companies are suggested to reduce their stress via MBSR workshop. This new intervention approach (i.e., MBSR training) is promising in releasing the stress as well as improving performance and productivity of the organization. Many international renowned companies including Google, GlaxoSmithKline, General Mills Inc. and so on are using mindfulness training to reduce workplace stress and increase productivity (Little 2018). The positive and practical impacts of MBSR are validated by the present study as the majority of mindfulness characteristics significantly alleviate emotional stress and improve organizational performance, which also supports previous research (Rothlin et al. 2016). In the construction industry, proper sessions for such a workshop should be organized because this training helps the individual to cultivate a positive approach (e.g., communication, curiosity, non reactivity, and so on) and direct intellectual energy on the right path. Additionally, MBSR includes many informal activities, gatherings, games, yoga stretching, mindful walking, and entertainment events like singing and dancing to encourage interpersonal relationships and support within work groups (Leung et al. 2011). MBSR also enhances the sense of kindness, generosity, and affection among employees, which will make the organization a caring workplace (Kabat-Zinn 1990). In such a friendly working environment the physical and mental health of employees will flourish and ultimately individuals' commitment and sense of belonging to an organization will also increase.

Given that the CPs need to work in different companies, it would be interesting to uncover the effect of the MBSR on stress and performance in different working environments. We followed our participants for only two and a half months during an eight-week intervention and thus, we were unable to demonstrate the long-term effects of MBSR or to address any potential barriers associated with long-standing practice. To understand the influence of this new intervention more deeply, a longitudinal study is recommended to see the changes in the same subject over a long period (Murphy 2012). Furthermore, only self-reported daily practice time and personal experience data were collected in this study and possible recall bias could not be avoided. However, extensive literature was reviewed to form the scales in the questionnaire and all of the scales have been validated in the previous study. Only CPs was purposely selected as the respondents. Multiple research methods (quantitative and qualitative) were adopted to secure the psychometric properties. The latest wearable sensing and computing technologies, like wristband-type wearable sensor and EEG devices, are needed to collect data on participants' physical and mental status with minimal interruption of their activities (Jebelli et al. 2018). In addition, it may be worthwhile to further investigate the impact of *present focus mind* and *non-judging thoughts* on the performance. They may have positive role in regulating negative responses, clearing scattered mind and inducing sense of calmness in difficult situations (Taylor et al, 2016). Finally, future studies can be conducted on other variables such as stressors, commitment, and coping behaviors to optimize stress management.

7 CONCLUSION

This study has investigated the impact of a new intervention approach (i.e., the MBSR workshop) for the stress management of CPs. For this, CPs were divided equally into workshop participants and a control group. To ensure psychometric properties, a validated scale for the questionnaire survey, semi-structured interview, and a series of statistical and contextual analyses were adopted. The study was able to identify differences in the mindfulness characteristics between the participants and the control group. It has confirmed that the MBSR workshop had a significant beneficial impact on the CPs. The majority of mindfulness characteristics (five of nine items) scored significantly higher among the MBSR participants post-intervention. In addition, this novel approach has reduced the emotional stress and improved the organizational performance of CPs involved in the training. This study also confirms the negative influence of emotional stress on organizational performance. In conclusion, this innovative workshop is very effective both in reducing stress and enhancing the performance of CPs. Hence, it is strongly recommended that MBSR workshops and other mindfulness-based training courses be offered in construction organizations. The limitations of this study have also been identified. Recommendations for the direction of future study have also been made, including more variables like stressors, commitment,

and coping behaviors. These results form a foundation for future longitudinal studies on stress management interventions for CPs.

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